

# It pays to compare: Comparison helps children grasp math concepts

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Comparing different ways of solving math problems is a great way to help middle schoolers learn new math concepts, researchers from Vanderbilt and Harvard universities have found.

"We found that comparing different ways to solve a problem helped middle-school students become more flexible problem solvers and better understand the concepts behind the methods," Bethany Rittle-Johnson, assistant professor of psychology and human development at Vanderbilt University's Peabody College and co-author of the new research, said.

Rittle-Johnson and her colleague and co-author, Jon Star, assistant professor at the Harvard Graduate School of Education, also found that comparing different solution methods was more effective than comparing different problems solved using the same solution. "Overall, students should not just learn one way to solve a [math](#) problem; rather, they should learn multiple ways and be encouraged to compare the benefits and drawbacks of each," she said.

The findings are summarized in two studies, one recently published in the *Journal of Experimental Psychology* and the other in press at the [Journal of Educational Psychology](#).

"In U.S. math classes, teachers typically demonstrate a procedure for solving a problem and then have children practice solving related problems," Rittle-Johnson said. "Students have very few opportunities to compare different ways to solve problems and tend to solve problems in

a single way with limited understanding of why the way works."

In the new studies, Rittle-Johnson and Star found seventh and eighth graders who compared two different ways to solve equations were both more accurate and more flexible in how they solved equations. The benefits of comparison were most pronounced when the examples being compared differed on key features.

They saw the same effect when fifth graders were working on problems that involved estimation.

"In a past study, we found that seventh graders who compared two different ways to solve equations were both more accurate and more flexible in their equation solving. In our recent studies, we found similar benefits for fifth graders learning about estimation," Rittle-Johnson said.

Source: Vanderbilt University

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